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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-23. (CANCELLED).

24. (NEW) A method of accessing the transport header of packets that do not include an Internet header length field, characterized in that the method comprises the steps of:

- (a) caching extension header data indicative of the length of extension headers of packets;
- (b) responsive to a packet containing extension headers, building a cache key for said packet and performing a cache lookup for a cache entry corresponding to said cache key; and
- (c) responsive to finding a corresponding cache entry, reading said extension headers data in parallel to arrive at and read fields in the upper-layer header.

25. (NEW) The method as defined in claim 24 wherein the packet is an IPv6 packet.

26. (NEW) The method as defined in claim 24 wherein said cache key is calculated using two fields of the Internet header of said packet.

27. (NEW) The method as defined in claim 26 wherein the two fields used for calculating said cache key are the IP source address and a flow label for packets that have a flow label, and the IP source and destination addresses for packets that do not have a flow label.

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28. (NEW) The method as defined in claim 26 wherein the two fields are the source address, flow label and the next header or source and destination addresses and the next header.

29. (NEW) The method as defined in claim 24 wherein the cache lookup is performed using a table containing lengths of extension headers.

30. (NEW) The method as defined in claim 24 wherein step d) includes reading the first extension header of said subsequent packet while the cache lookup is being performed on the remainder of the extension headers.

31. (NEW) The method of claim 24, further comprising, if a cache entry corresponding to said cache key of said packet is not found,

- i) caching extension headers data obtained by serially traversing all extension headers of said packet, and associating said cache key with a cache entry corresponding to said extension headers data;
- ii) responsive to a subsequent packet having the same cache key, performing a search for said cache entry based on said cache key; and
- iii) performing step (c) for said subsequent packet.

32. (NEW) The method of claim 31, further comprising, if said subsequent packet has the same cache key but comprises additional option headers besides the option headers cached for said cache entry, the step of:

- iv) updating said optional headers data by caching additional extension headers data obtained by serially traversing

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all additional extension headers of said subsequent packet.

33. (NEW) The method as defined in claim 24 including the step of detecting packets with hop-by-hop and routing extension headers and determining whether performing steps (b) and (c) is required for such packets.

34. (NEW) The method as defined in claim 31 wherein step iv) is not performed if said subsequent packet has the same cache key but the optional headers data corresponding to said cache key does not match the optional headers of said packet.

35. (NEW) A system for accessing upper-layer headers in packets that do not include an Internet header length field comprising:

means for caching extension header data indicative of the length of extension headers of packets;

means for building a cache key for a packet containing extension headers, and performing a cache lookup for a cache entry corresponding to said cache key; and

means for reading said extension headers data in parallel responsive to finding a cache entry corresponding to said cache key, to arrive at and read fields in the upper-layer header.